


FEASIBILITY STUDY


Pender County, New Connector
from I-40 at Burgaw to US 421
FS 90007

Prepared by
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I. DESCRIPTION

This report covers a preliminary study of a possible connector from I-40 to US 421, a distance of approximately 11.2 miles (see Figure 1). Specifically, the studied connector begins at the I-40/NC 53 interchange, follows a 0.4 mile portion of NC 53, then swings on new location for approximately 2.2 miles to connect with SR 1345 at SR 1340, and then generally utilizes the existing alignments of 4.4 miles of SR 1340 and 4.2 miles of SR 1120 to US 421. The study was made at the request of Mr. W. G. Marley, Jr., State Highway Administrator.

II. PURPOSE OF CONNECTOR

Studied Location Characteristics

SR 1120 is classified as a rural minor collector, and SR 1340 is classified as rural local in the North Carolina Functional Classification Plan. SR 1120 from US 421 to SR 1340 is a 2-lane, 20-foot facility with narrow 3 to 4-foot grassed shoulders. SR 1340 from SR 1120 to NC 53 is an unpaved gravel roadway approximately 0.5 mile long. SR 1340 from NC 53 to SR 1345 is basically an 18 to 20-foot paved facility. The existing right-of-way along SR 1120 and SR 1340 is 60 feet.

The extension of SR 1340 would cross US 117 at SR 1367 and connect with NC 53 at SR 1508. At this point NC 53 is a paved 24 foot facility with 6 foot grassed shoulders. The extension crosses the bed of CSX railroad which has been abandoned since 1986. NC 53 interchanges with Interstate 40 in the form of a half clover south of NC 53. At the west end of the connector, US 421 is a 2-lane, 24-foot pavement with 4-foot paved shoulders on each side.

The alignment along SR 1120 is good, and the alignment along SR 1340 is generally good with the exception of two adverse curves just south of SR 1332. The speed limit along both secondary routes is 55 mph.

Land development along the entire studied location is predominately agricultural with woodlands and scattered residential. A sanitary landfill is located just off SR 1340 near SR 1332.

There are two bridges located along the studied connector. They are listed below with pertinent information.

<u>BRIDGE NO.</u>	<u>LOCATION</u>	<u>LENGTH (FT.)</u>	<u>WIDTH (FT.)</u>	<u>AGE (YRS.)</u>	<u>RATING (NEW=100)</u>
07	SR 1340, Branch of Long Creek	52	24	21	38.8
09	SR 1120, Long Creek	188	24	38	16.4

Both bridges have a posted weight limit. Bridge 07 has a weight limit of 24 tons for single vehicles and 35 tons for truck tractor semi-trailers (TTST). Bridge 09 has a posted limit of 23 tons for single vehicles and 31 tons for TTST.

Neither bridge is listed in the Transportation Improvement Program for replacement.

Traffic Volumes, and Capacity

The current traffic volume along SR 1340 is approximately 200 vehicles per day (VPD). Along SR 1120 near US 421, the traffic volume is approximately 1300 VPD. The traffic volume on NC 53 at I-40 is 4800 VPD. If the connector is implemented, estimated traffic by the year 2010 would range from 3200 to 6100 VPD.

The capacity of a two-lane road at level of service C in an area that is rural in nature is approximately 6000 VPD. Considering existing and future traffic volumes, a two-lane facility should be adequate through the planning period.

III. CONSIDERED IMPROVEMENTS AND COSTS

The studied cross section for the new connector including the 2.2 mile extension of SR 1340 to NC 53 is a 24-foot pavement with 10-foot usable shoulders, including 2-foot paved. The extension of SR 1340 to NC 53 would have the through movement to access Interstate 40. Also, the through movement would be given to the new connector at the intersection of SR 1120 and SR 1340.

Both bridges on the studied connector would have to be replaced due to the posted weight limits, age, and sufficiency ratings of the structures.

The two curves on SR 1340 just south of SR 1332 would have to be realigned to obtain a safe 55 mph speed limit. This would require a relocation of SR 1340 for approximately 0.7 mile.

In conjunction with implementing the connector from I-40 to US 421, it would be desirable to widen US 421 to a 4-lane divided facility with

a 46-foot median, from SR 1120 to the existing 4-lane section just north of NC 210, a distance of approximately 2.8 miles.

Estimated right-of-way width used for cost estimating purposes from I-40 to US 421 is 100 feet. Existing right-of-way on US 421 from NC 210 to NC 53 is 250 feet, which would be adequate for a four-lane divided section.

The estimated cost of the considered improvement is:

	<u>Construction Cost</u>	<u>Right-of-way Cost</u>	<u>Total Cost</u>
Improvements from I-40 to US 421 ¹	\$6,600,000	\$2,100,000	\$ 8,700,000
Widening US 421 to 4-lane divided	\$2,800,000	\$ 0	\$ 2,800,000
			<u>\$ 11,500,000</u>

¹ including replacement of both bridges over Long Creek

The construction cost includes engineering and contingencies, and the right-of-way cost includes relocation, acquisition, and utility costs.

The implementation of the studied facility would not result in any significant impact on the environment. The construction would require the relocation of an estimated 8 residences and 1 business.

IV. ECONOMIC ANALYSIS

An economic analysis was made to determine the cost savings of traveling along the studied connector and US 421 as opposed to traveling along I-40, NC 132, and US 17 through Wilmington. Both routes are approximately the same distance. Using cost per mile rates based on type of facility and average running speed and cost of stops, the annual travel cost savings utilizing the new connector are calculated to be \$150,000. The annual capitalization cost of providing the connector is estimated to be \$870,000, resulting in a benefit/cost ratio of 0.20.

V. ALTERNATIVES CONSIDERED

One alternative, proposed by the Division Engineer, was studied (see Figures 1 and 2). This alternative would be entirely on new location, and would begin at the existing grade separation between US 117 and I-40 and terminate at the intersection of NC 53 and US 421. It would be 10.8 miles long with a 24-foot shoulder section on 100 feet of right-of-way. It would require the provision of an interchange at I-40 and would be a partial control of access facility (generally one access per property).

The estimated cost of the alternative is as follows:

	<u>Construction Cost</u>	<u>Right-of-way Cost</u>	<u>Total Cost</u>
Improvements from I-40 to US 421 including interchange.	\$ 12,900,000	\$1,000,000	\$13,900,000

The construction of the facility would require the relocation of an estimated 3 residences and 1 businesses.

The advantages of the alternate over the studied connector is that it would have less residential relocatees and provide a safer and more desirable connector. The disadvantages are its higher cost and lower benefit/cost ratio (0.01).

VI. CONCLUSION

The proposed Wilmington Bypass (R-2633) (See Figure 2) is listed in the Transportation Improvement Program (1991-1997) for right-of-way acquisition to begin in FY 1994. Construction is scheduled to begin in FY 1996. Even under ideal conditions the proposed bypass would not be open for traffic for at least ten years.

A high-type connector from I-40 to US 421 would provide a quicker and temporary alternate route to US 17 and points southwest of Wilmington; however, it cannot be economically justified on the basis of road users cost savings. Also, a connector would not be expected to transfer more than 2000 vpd initially and 4000 vpd by year 2010 from I-40 to US 421. The magnitude of this transfer would not provide significant relief to congestion on NC 132 and US 17 in Wilmington, where current traffic volumes already exceed 40,000 vpd at certain locations.

Therefore, due to the high cost of providing a connector, and insufficient benefits that would be derived, from the connector, neither of the alternatives can be justified.

RJB/sdt

